

Wireless Communication Master Plan

Prepared by the
Wichita-Sedgwick County Metropolitan Area Planning Department

With the assistance of
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August, 2000

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I. Executive Summary

The City of Wichita and Sedgwick County have decided to modify regulations for wireless communication through a Wireless Communication Master Plan. The Wireless Communication Master Plan attempts to provide a clear sense of intention for wireless communication industry representatives, tower builders, landowners, and the general public on where and how City and County leaders hope to see the new facilities deployed in the future. All of the various stakeholders have been consulted extensively during the preparation of the Plan.

Definitions of technical terms are provided in Appendix A. Two key terms used in this plan have a subtle, but important, distinction. The term “wireless communication” includes all forms of wireless uses except for private dispatch systems and amateur radio. The term “personal wireless services” refers only to those services that are designated as protected services by the Telecommunications Act of 1996. The subtle distinction between these terms is explained in Chapter III.

Currently, the Unified Zoning Code confines “towers” to only a few zoning districts in the City, and subjects many of them to multiple hearing reviews. In the County, most new “towers” must go through a Conditional Use permitting process. The approach in this Plan encourages short or disguised facilities almost anywhere, and with only administrative review, while providing appropriate guidelines to consider taller “towers” through a more streamlined public review process. Given the uncertainties of future technology and consumer demand, no one can reliably pinpoint all the locations for future wireless communication facilities. The current zoning code lacks a framework of principles and guidelines for making individual decisions in a consistent, purposeful manner. The Plan is intended to provide that framework, and provides background information on wireless communication issues and, beginning on page 12, includes recommendations on:

- Location/height guidelines
- Design guidelines
- Structural design and co-location requirements
- Submittal requirements
- Operations standards

The City of Wichita and Sedgwick County should adopt the Wireless Communication Master Plan as an element of the city-county comprehensive

plan, to use as a general guide to decision-making and to revise the Unified Zoning Code.

II. Introduction

On July 20, 1999, the City of Wichita adopted a moratorium on the approval of commercial communication towers used for transmitting and/or receiving wireless signals. Although Sedgwick County did not adopt such a moratorium, the two jurisdictions share planning and zoning functions through the Metropolitan Area Planning Commission (MAPC). Both the City of Wichita and Sedgwick County determined that they needed a clearer framework within which they could review proposals for wireless communication facilities. On August 17, 1999, the City of Wichita and Sedgwick County retained Kreines & Kreines, Inc. to prepare a Wireless Communication Master Plan.

Cities and counties are accustomed to preparing plans, usually in the comprehensive plan format. Comprehensive plans are usually prepared after a lengthy process including goal-formulation and objective setting. This effort did not have this luxury of time: a rapid planning process was established in the attempt to complete the plan before the expiration of the moratorium.

As part of the planning process, an extensive outreach program with the community and wireless communication industry representatives was conducted. Community workshops were held on September 29, 1999 and October 27, 1999. An industry roundtable was held on September 30, 1999 and an industry presentation was held on October 27, 1999. In addition, a questionnaire was sent to industry representatives and meetings were held with individual industry representatives. After a workshop with the City Council, County Commission and MAPC on November 23, 1999 to review a draft plan prepared by the consultant, a city-county staff task force was assigned to meet further with the various stakeholders and prepare revisions to the draft plan. The city-county task force held numerous meetings with these stakeholders from December 1999 through July 2000, and helped mold the Plan to the current edition.

The left-hand column below lists issues that were brought up at the community workshops, industry roundtable and industry interviews. The right-hand column contains responses from the consultant:

Industry Issues	Responses
The wireless industry wants flexibility in the approvals process.	The Plan achieves flexibility in types of reviews, types of facilities and types of outcomes ... the choice is up to the applicant.
Carriers want to get a signal out from a base station, as well as to get a signal back from the handset. To do that, for the time being anyway, tall "towers" may be needed.	There are alternatives to tall "towers", and if the industry can't consider them for economic reasons, the public sector should consider them for public benefit reasons.

The wireless industry maintains that wireless communication facility sites can only be reviewed on a case-by-case basis.	Planning means making consistently fair decisions by comparing alternatives to uniform standards and deciding which alternative is best for the community.
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The citizens asked the carriers: how long will this “tower” building trend last? The wireless industry responded that it is a market-driven business and, as long as the consumer demands capacity, the carriers will need to build wireless communication facility sites.	Public planning has dealt with market forces before: what is needed is a balance among the public health, safety as well as welfare and the need to deploy infrastructure quickly with minimum regulation.
Intense competition requires that carriers divulge as little information as they can to the public sector.	Planning depends on information and, without certainty, assumptions must be made about future growth.
The individual carriers plan for the future with geographic sites, around which predictable radio frequency (RF) coverage is determined through graphic modeling.	Planning means creating policies rather than drafting maps of precise plans. Exactly where a wireless communication facility is placed becomes less important than its general location, how it is sited in that location and how it is designed.

These issues need not conflict. The quest is for balance, and the governing bodies of the City of Wichita and Sedgwick County intend to strike that balance by adoption of this Plan.

III. Scope of the Wireless Communications Master Plan

A. What is a “Tower”?

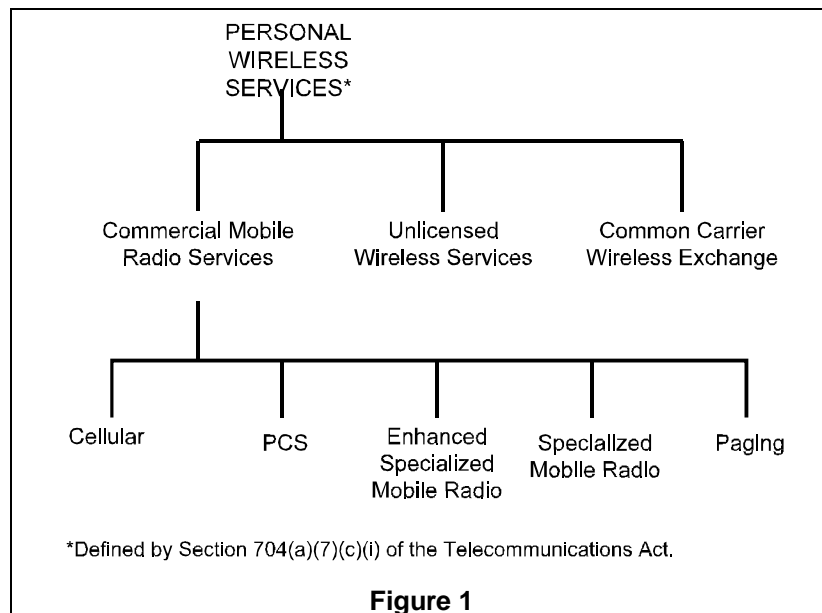
The term “tower” is generally used to describe all wireless communication facilities or sometimes is used to refer only to those wireless communication facilities at high elevations above grade. Wichita/Sedgwick County should avoid the use of the term “tower” because its meaning is not clear. How tall is a “tower”? Can a “tower” be short? Can a “tower” be on top of a building? Can a “tower” be on top of another “tower”? Is a monopole a “tower”? The terms “wireless communication facility” or “support structure” should be used instead of “tower” because they more clearly refer to the many possible methods of deploying wireless communication technology.

B. Protected Services

Section 704 of the Telecommunications Act of 1996 preserves local zoning authority over the placement, construction and modification of personal wireless service facilities with some limitations or protections from regulation by local governments. The limitations and protections are listed in Appendix C.

The carriers that are protected by the Telecommunications Act are shown in Figure 1.

In addition, the Federal Communications Commission (FCC) considers the group of five “Commercial Mobile Radio Services” shown in Figure 1 as “functionally equivalent services.” The Telecommunications Act prohibits local governments from unreasonable discrimination among providers of functionally equivalent services.



This Plan is intended to apply to protected services as well as to unprotected services (described below). It is good practice to extend the same planning process to all forms of wireless communication. It should be kept in mind that many of the following unprotected services facilities are used for the co-location of protected services facilities.

C. Unprotected Services

Section 704 of the Telecommunications Act of 1996 does not cover the following unprotected services.

1. Broadcast Systems

Broadcast systems for AM/FM radio and television are expected to be proposed for only a few strategic locations throughout the Wichita/Sedgwick County area. Because of their height requirements, broadcast facilities should be located as far outside the urbanized area as possible and outside the approach zones for airports and airstrips.

Once existing personal wireless service facilities are inventoried and mapped, those areas least covered by existing personal wireless service facilities may in some cases provide co-location opportunities for new broadcast facilities. Future personal wireless services also may seek out broadcast facilities for co-location before building new facilities of their own.

2. Public Service & Emergency Systems

Wichita/Sedgwick County and other public/governmental agencies should not locate any facilities that contravene guidelines that wireless communication facilities are held to in this Plan. It sends a negative message when the regulatory authority holds itself less accountable than the private sector in the name of “public safety.”

Although the Sedgwick County 800 MHz radio system is successfully deployed, the system may be augmented as new challenges present themselves. Future public facilities (e.g., City/County dispatch, broadband wireless microwave, etc.) on support structures should be systematically planned so that other wireless communication facilities may be co-located on them.

The Wichita Unified School District microwave data and phone system is also included in the “Public Service” category, and there likely will be substantial opportunities for wireless communication facility co-location on school “towers” that should limit the need for constructing as many more new wireless communication facilities.

3. *Wireless Cable Systems*

At one time, the FCC issued by lottery Multipoint Multichannel Distribution Service (MMDS) spectrum in 2-plus GHz range (anywhere from 2.1 GHz to 2.8 GHz) for the commercial offering of TV service via a point-to-multipoint system, from which individual subscribers in one building or a small area could be served by microwave. Such “wireless cable” applications for TV service has not been widely used since other media, including the Direct Broadcast Satellite (DBS), offer many more channels at competitive prices.

However, wireless cable has other applications that are only now being realized. For example, fixed telephone and data service can be offered over wireless cable. As the use of wireless cable expands, some high support structures will be sought to deploy the systems. The high support structures will be needed in several locations for each carrier, who will install antennas that send and receive signals to multiple end-users. To the extent possible, the antennas requiring high support structures should be co-located with other wireless communication facilities. The support structure at the end-user’s location is likely be a small lattice tower, no larger than 18 inches on a side, that will be similar in appearance and function as the support structures used for private dispatch systems.

4. *Private Dispatch Systems*

Many contractors and taxicabs have two-way radios that function similarly to personal wireless services. The difference is that most private dispatch systems are *non-commercial*; that is, they were licensed to one company for that company’s use and not to be shared with, or leased to, other users. These companies are usually small businesses that are currently seeing their licensed frequencies made available by the federal government for auction to “commercial” wireless communication providers.

Private dispatch systems (and amateur “ham” radio) should continue to be regulated separately from the commercial wireless communication. Their purposes are narrowly drawn by the FCC and their use is truly “accessory” to the license-holder.

The intended application of “accessory use” in the Unified Zoning Code is to be attendant to the user’s transceiver site. This definition should still be available to:

- Private dispatch systems
- Amateur (ham) radio operators

The guidelines proposed as policies in the Plan should not apply to these license holders, whose facilities are commonly smaller than PCS and cellular support structures.

However, many private dispatch system support structures are on commercial buildings and extend quite high (e.g., over 40 feet). Once they are physically strengthened or reconstructed, these sites make excellent candidates for co-location and, at such time that a wireless communication provider proposes them for co-location, they would be subject to policies in this Plan.

D. Tower Builders

There are companies that specialize in building and managing “towers.” These companies rent space on their “towers” to wireless communication providers. The tower building companies are not included in the FCC definition of functionally equivalent services or personal wireless services. Tower builders would like to be treated in a similar fashion as other builders and developers seeking permission to place, construct or modify a structure. However, whereas competition is encouraged almost unfettered for most types of development, the City’s and County’s policy toward “towers” should be different, in recognition of the objective to limit the number and visibility of “towers” in the community while still meeting the public’s wireless communication needs.

IV. Unified Zoning Code & Comprehensive Plan, *Preparing for Change*

Both the City of Wichita and Sedgwick County regulate wireless communication facility sites with a comprehensive zoning ordinance called the Unified Zoning Code. The Unified Zoning Code has a direct relationship with the Wichita/Sedgwick County Comprehensive Plan, *Preparing for Change*. The regulations in the Unified Zoning Code can be explained and defended by the Comprehensive Plan's rationale. However, because the Comprehensive Plan was prepared prior to the sudden increase in wireless communication, there is no discussion of wireless communication in the Comprehensive Plan.

A. Definitions

Appendix A contains a list of definitions of terms and concepts used in wireless communication planning that should be introduced to *Preparing for Change*, the Wichita-Sedgwick County Comprehensive Plan and used as needed the Unified Zoning Code.

The current Unified Zoning Code defines "communications towers, commercial" differently than rooftop "antennas." In terms of infrastructure, it is important to realize that the antennas for a wireless communication facility mounted on a "tower" have the same functions as antennas mounted on a roof or other support structure.

B. Use Regulations

The Unified Zoning Code uses the concept of a "Communications Tower, Commercial" as the only type of wireless communication facility to be designated as a primary use. A more inclusive category is needed for wireless communication facilities in the Unified Zoning Code.

Wireless communication facilities vary widely in form and appearance, so they cannot all be treated as "towers" or "antennas." Some types of facilities potentially could be permitted in all districts, while other types may be acceptable in some districts but not in others.

C. Accessory Use

Only private dispatch systems and amateur radio should be treated as an "accessory use" on sites with other primary uses, since wireless communication facilities serve a large area and not just the primary use on a site. The notion that any roof-mount is an accessory use, and that such accessory use could be on single-family residence rooftops, is in conflict with most deployment practices.

While a wireless communication facility site may be appropriate to locate in a single family neighborhood, it should not be on a house.

V. Alternatives are the Heart of the Planning Process

Wireless communication technology is so young, and the public sector's familiarity with it is so limited, that considerable uncertainty lies ahead. A flexible planning process is required rather than one that attempts to locate all future sites on a point-by-point basis. But that process should be informed by knowledge about possible alternatives to the way that wireless communication providers typically deploy their infrastructure.

A. Facilities that Provide Alternatives to "Towers"

Figure 2 shows a flush mounted antenna on a short utility pole. Pictured is a 40-foot AGL support structure that has a small street light attached. Flush mounted antennas work well in cluttered (urban or heavily treed) environments. However, the signal doesn't travel as far as the typical top-hat of triangular antenna arrays; therefore, use of flush mounted antennas may require additional wireless communication facilities to achieve the same coverage. Figure 3 is an



example from Wichita/Sedgwick County of a top-hat of triangular antenna arrays.

B. Demand for Wireless Communication Will Require Alternatives

Wireless communication is a supply-side market. As technology enables faster and more ubiquitous information exchange, people and businesses will say they “gotta have” wireless communication. This demand is constantly being fed by a technology-driven supply side, offering innovations that few ever dreamed of. And all of these innovations offer alternatives.

There are essentially two ways in which wireless communication make things easier:

- They make communication easier from place to place (broadband).
- They allow individuals to be “connected” anywhere at any time (personal).

New broadband wireless communication such as Teligent and WinStar (both available in some office buildings in larger metropolitan areas) are in demand. These new services are in demand because they are cheaper and quicker alternatives than conventional copper wire telephone service for delivering high speed data. A Local Multipoint Distribution Services (LMDS) carrier, which is similar to those services, is already deploying in Wichita-Sedgwick County. Within a few years, broadband wireless communications are expected have total coverage in the City/County.

Unlike broadband wireless communication, personal wireless services are not tied to place, but to individual end-users. But they need base-stations in many locations. The benefit from personal wireless services is that they are intended to be used everywhere. However, the current Unified Zoning Code regulations do not permit personal wireless service facilities to reach everywhere in the City/County, because it limits the alternatives to rooftops or “towers.” For example, the signal for some carriers on existing “towers” and rooftops may be detected in residential areas like College Hill, but it is too weak to guarantee constant, high quality service; therefore, there needs to be an alternative to “towers.”

C. How Many Will There Be & What Will They Look Like?

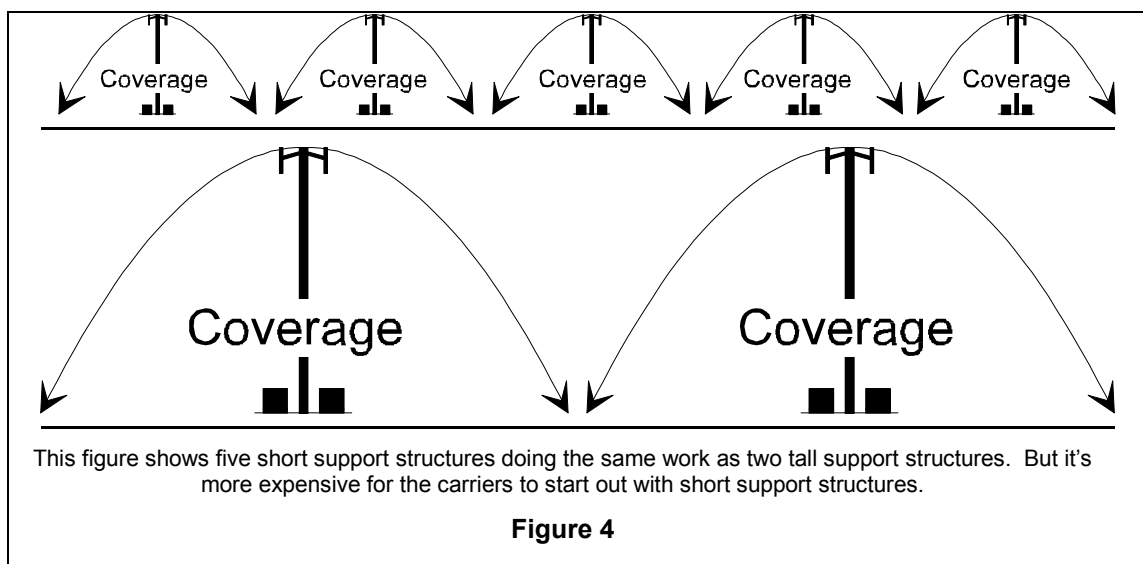
Neither the Telecommunications Act of 1996 nor FCC regulations have addressed the huge infrastructure demands that personal wireless services will have on local governments.

There will be hundreds of personal wireless service facility sites in the City of Wichita/Sedgwick County area by the year 2020. They will not appear all at once, but rather in three phases:

- Coverage. The initial phase where carriers try to spread their signal everywhere in an attempt to reach new subscribers.
- Capacity. New capacity sites are built between coverage sites.
- Residential. Entry into residential areas is the final part of the business plan of most personal wireless service providers to replace wired phones in customers homes.

It is the last phase of personal wireless service deployment that brings personal wireless service sites into the very residential areas where they are traditionally restricted to infrequent sites.

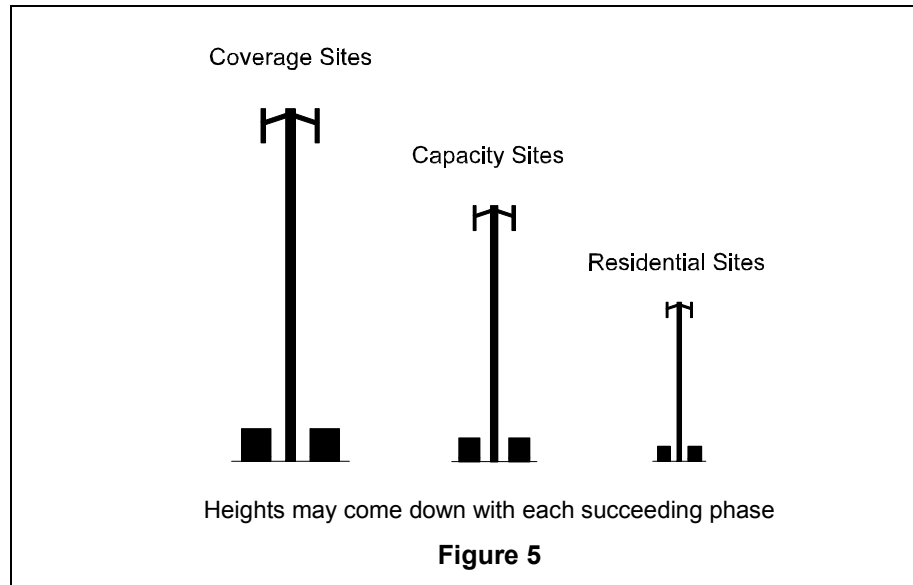
Some carriers, in other regions of the U.S., offer personal wireless service facilities at low heights. Figure 4 shows how height determines coverage and how lower support structures can achieve the same coverage as higher support structures, there just needs to be more support structures.



Most carriers will avoid low heights in the first phase of deployment because the objective initially is to achieve the most coverage from the fewest sites. The higher the support structure, the greater the coverage from each site, but these heights may come down as shown in Figure 5.

If carriers were required to begin with the Capacity Phase, instead of beginning with the Coverage Phase, the personal wireless service facilities would be much

shorter than those in the Coverage Phase, but there would be more of them in the early years. That would be very expensive for the carriers in the short run, even though it may well be the



ultimate deployment pattern in the long run. In addition to cost, the uncertainty regarding the location of personal wireless service facilities needed for the Capacity Phase has prevented carriers from beginning with the Capacity Phase in any market, and if carriers were required to begin with the Capacity Phase in Wichita/Sedgwick County, unnecessary "towers" likely would be constructed.

Ultimate deployment means the planned phasing of personal wireless service facility locations when viewed as a whole. These are the consequences for three phases of deployment in the City of Wichita/Sedgwick County:

- Coverage. There are approximately 150 facilities in the City/County area today and they give less than adequate coverage for cellular and only partial coverage for PCS and other services.
- Capacity. As the demand for systems grow, each carrier will need to add several sites in order to add capacity. This is already beginning to happen.
- Residential. In the long term, it is likely that there will have to be many more sites for each carrier.

The challenge of planning for personal wireless service facilities is the same as that for many other land uses: balancing marketplace demands with public expectations for an orderly and attractive environment. This Plan anticipates and guides future deployment with guidelines and policies that should be applied in the review of proposed new facilities, whether administratively or through public hearing boards.

VI. Location/Design Guidelines

This chapter contains guidelines for location, siting and design of new wireless communication facilities. The term “guidelines” is used in recognition that deviations from these guidelines can be considered on a case-by-case basis, if consistent with the general spirit and intent of this Plan.

A. Location/Height Guidelines

Many cities and counties restrict “towers” to specific land use districts (e.g., commercial and industrial) and preclude them from other land use districts (e.g., residential). The current Unified Zoning Code takes this approach by excluding “Commercial Communication Towers” from all but a few industrial and commercial districts, and requiring a Conditional Use for “towers” in suburban and rural residential districts. In some cases, applicants must seek a variance from “compatibility standards”, from the Board of Zoning Appeals, as well as zoning approval through the Planning Commission and governing body.

This plan suggests a more streamlined review process but one that is guided by the principles and guidelines that are outlined below.

1. The following wireless communication facilities should be permitted by right in any zoning district, subject to the issuance of a building permit, if they conform to the Location/Design Guidelines in this chapter.
 - a. New facilities that are concealed in or mounted on top of or the side of existing buildings (excluding single-family and duplex residences) and other structures, including support structures up to 20 feet above the building or the maximum height permitted by a building permit or an administrative permit in the underlying zoning district, whichever is greater.
 - b. Modification and/or replacement of support structures (light poles, flag poles, electrical poles, private dispatch towers, etc.) that are not significantly more visible or intrusive, including cumulative height extensions of up to 25 percent above the original structure height.
 - c. Modification and/or replacement of wireless communication facilities, including cumulative height extensions of up to 25 percent above the original structure height that comply with the compatibility height standards of the Unified Zoning Code¹.
 - d. New or modified lattice towers no larger than 18 inches wide on any side up to 80 feet in height measured from grade.

If the Zoning Administrator determines that the wireless communication facility does not conform to the Location/Design Guidelines, the building

permit should be denied. Denied building permits may be appealed by applying for an Administrative Permit or a Conditional Use. An Administrative Permit should be approved subject to conditions that maintain conformance with the Location/Design Guidelines. Wireless communication facilities that do not conform to the Location/Design Guidelines may be approved for a Conditional Use on a case-by-case basis as circumstances warrant.

2. The following wireless communication facilities should be approved by Administrative Permit in any zoning district, with the concurrence of the Director of Planning and the Zoning Administrator, if they conform to the Location/Design Guidelines in this chapter.
 - a. New disguised ground-mounted facilities up to 85 feet in height.
 - b. New undisguised ground-mounted facilities up to 65 feet that comply with the compatibility height standards of the Unified Zoning Code¹.
 - c. New undisguised ground-mounted facilities up to 85 feet in height in the “LC” Limited Commercial zoning district that comply with the compatibility height standards of the Unified Zoning Code¹.
 - d. New ground-mounted facilities up to 150 feet in height in the “GC” General Commercial and more intensive zoning districts that comply with the compatibility height standards of the Unified Zoning Code¹.
3. Wireless communication facilities that exceed the maximum height for an Administrative Permit should be reviewed through the Conditional Use process of the Unified Zoning Code. Conditional Use approvals typically should be subject to conditions that maintain conformance with the Location/Design Guidelines in this chapter; however, wireless communication facilities that do not conform to the Location/Design Guidelines may be approved for a Conditional Use on a case-by-case basis as circumstances warrant.
4. There should be no nighttime lighting of or on wireless communication facilities except for aircraft warning lights or similar emergency warning lights required by applicable governmental agencies. No strobe lights should be used. Lighting for security purposes should be permitted at the

¹ The compatibility height standards should be amended in the future so they are applicable when “towers” and other structures are adjacent to property *developed* with single-family or duplex uses, regardless of zoning, and vacant property zoned “TF-3” Two-Family Residential or more restrictive. More immediately, the compatibility height standards should be amended for wireless communication facilities to require a setback distance equal to the structure height, with administrative authority for Zoning Adjustments to allow a reduction or waiver of the compatibility height standard.

base of wireless communication facilities. Temporary lighting for nighttime repairs should be permitted.

5. No signs should be allowed on an antenna support structure other than those required by applicable governmental agencies.
6. At the time of requesting a Conditional Use or administrative approval for a new ground-mounted wireless communication facility, as applicable, the applicant should demonstrate to the satisfaction of the approving authority that: 1) there is no available space on existing or approved wireless communication facilities or other structures that can be utilized to meet the applicant's communication needs (an existing site will be considered "available space" only if the site is economically and technically feasible with a ready, willing, and able landlord); and 2) there is no other economically and technically feasible opportunity to modify or rebuild an existing structure on which the communication equipment may be located (a rebuilding opportunity will be considered economically feasible if the cost of rebuilding an existing facility is no more than the cost of building a new facility on a new site).
7. At the time of requesting a Conditional Use or administrative approval for a wireless communication facility, as applicable, the owner of a proposed new undisguised ground-mounted wireless communication facility, and the owner of the land, if not the same, should agree in writing that a) the support structure is designed, and the ground area is adequate or can be made adequate, to accommodate at least 1 other carrier, if more than 80 feet in height, and at least 2 other carriers, if more than 100 feet in height; b) reasonable accommodations will be made to lease space on the facility to other carriers so as to avoid having a proliferation of support structures that are not fully utilized; and c) the owner(s) will make available in the future the opportunity for another party to pay the cost to modify or rebuild the structure to support additional communication equipment where economically and technically feasible. Lattice towers no larger than 18 inches on any side should be excluded from the co-location requirements of subsection a) of this paragraph.
8. The owner should be responsible for the removal of unused facilities, including the uppermost 20% of support structures that are unused (except where removal of the uppermost 20% would require the removal of a lower portion the support structure that is in use, in which case the required removal will be raised to the next highest portion of the support structure not in use), within 60 days if the wireless communication facility, or portion thereof, has been unused for 12 consecutive months. If such a facility or portion of a facility is not removed by the owner, then the City or County may employ all legal measures, including, if necessary, obtaining

authorization from a court of competent jurisdiction, to remove it, and after removal may place a lien on the subject property for all direct and indirect costs incurred in its dismantling and disposal, including court costs and reasonable attorney fees. Under this paragraph, “owner” includes both the owner of the real property and the owner of the wireless communication facility, whether such ownership is divided or in the same person.

9. New support structures should not be located in the flight paths of local airports where they would constitute a potential hazard to air safety.
10. All wireless communication facilities should comply with all federal, state, and local rules and regulations.

Wireless communication providers are particularly encouraged to seek the following new locations for new facilities:

1. Mounted on top or the side of multistory buildings and other structures, appropriately concealed, screened, disguised or camouflaged.
2. On existing poles in street rights of way, including telephone poles, electrical transmission and distribution poles, street lights, and traffic signal stanchions; on existing parking lot and athletic field/stadium light standards; and on modified or rebuilt poles that are substantially similar in appearance.
3. On existing support structures, including those constructed for personal wireless services, AM/FM radio and television broadcast, school district microwave antennas, and private dispatch systems.
4. In wooded areas.
5. At certain City and County-owned properties, which should be identified and marketed as available, where the size and nature of the use does not interfere with other functions and allows for compatible siting; these may include multistory buildings, water towers, large park areas, sewer treatment plant sites, maintenance yards, and public airports.
6. The City and County should also work with public and private agencies such as KDOT, KTA, and KG&E, to encourage the use of highway light standards, sign structures, and electrical support structures for new wireless communication facilities.

B. Design Guidelines

As a general rule, the less visible and obtrusive a proposed wireless communication facility is, the more acceptable it will be to the community. The visibility of facilities can be minimized by techniques such as concealment, disguise, camouflage, and sensitive design and siting. Specific guidelines include:

1. Preserving the pre-existing character of the area as much as possible.
2. Minimizing the height, mass or proportion of the facility to minimize conflict with the character of its proposed surroundings.
3. Minimizing the silhouette presented by new support structures and antenna arrays. Generally, monopoles are favored over lattice-type support structures to a height of at least 150 feet, and antennas mounted flush to the support structure are favored over triangular “top-hat” antenna arrays.
4. Using colors, textures and materials that blend in with the existing environment; under some circumstances, surfaces should be painted, or otherwise treated, to match or complement existing background structures and surfaces, or the sky, as appropriate, and to minimize reflection. Painting support structures red and white may also be necessary to avoid strobe lighting that would otherwise be required by applicable governing agencies.
5. Concealing facilities within potential space in or on existing structures, or disguised to look like another type of facility, like a flagpole, clock tower, or church steeple.
6. Placing facilities in areas where trees and/or buildings obscure some or all the facility from view, and installing new plantings/screening around the site where visible from major streets or residential areas.
7. Placing facilities on existing walls, flush-mounted, or on roofs buildings (excluding single-family and duplex) and structures, up to 20 feet above the existing structure, as opposed to building new ground-mounted support structures. Facilities on rooftops generally should be set back from roof edges or screened from view.
8. Screening equipment shelters and cabinets through landscaping, walls and/or fencing, as appropriate to the surroundings and generally consistent with the City’s landscape ordinance. In most cases, ground-level equipment should respect the setbacks for accessory uses in the applicable zoning district and be enclosed by 6-8 foot high security fencing, of a material compatible with its surroundings. Equipment should be encouraged indoors

if space is available nearby. Burying equipment in an underground vault, to keep most of the equipment out of sight, may be necessary in rights of way and in some other visually/environmentally sensitive locations, such as tourist attractions, historic landmarks/districts, museum district, river corridor, and other locations of civic importance or architectural significance. Ground level shelters/equipment, appropriately screened and generally landscaped with trees and/or shrubs, should be permitted on lots adjacent to rights of way, to facilitate the use or reconstruction of utility poles in those rights of way.

9. Permitting lighting on facilities only if required by federal regulations, and not by strobes (except by variance), as per the current zoning code.

C. Structural Design and Co-location

Tornadoes and high winds can pose a threat to any structure. Wind loading may be satisfied as a manufacturing standard, but the support structure itself could be threatened in some situations. Wind load design standards should be those of the local building codes in use in Wichita/Sedgwick County or EIA-TIA 22 (latest version), whichever is stricter.

This Plan generally encourages co-location on existing and new facilities to limit the total number of support structures required to provide wireless communication services to the community. However, in some cases, one taller support structure with numerous antenna arrays in a sensitive location may present a greater visual impact than several shorter support structures. Support structures over 80 feet should generally be designed to accommodate at least 2 carriers, and support structures over 100 feet at least 3 carriers. New support structures should be no taller than needed to accommodate the identified carrier(s), but also should be designed in most cases to readily accommodate 20-30 foot extensions. Reasonable accommodation should also be provided at ground level to accommodate future equipment shelters.

Depending upon the type of technology, vertical co-location does not necessarily need 20 feet, 10 feet or even five feet of separation between different carriers' antennas. Antennas sometimes can be placed "tip-to-tip" by using filtering, buffering and shielding software. Horizontal co-location is the clustering of two or more support structures in a common area. Some jurisdictions require a minimum spacing between support structures in order to avoid an "antenna farm" appearance. This plan does not suggest an overall spacing requirement, but leaves that visual impact question to be decided on a case-by-case basis.

D. Rights of Way

City and County rights of way present opportunities for installing some future wireless communication facilities. By Law, the right to locate such facilities will generally require entering into franchise agreements. The City and County can encourage appropriate utilization of right of way by keeping “lease” rates competitive and ensuring longer term use of the right of way.

E. Submittal Requirements

Review of proposals for new wireless communication facilities will be greatly aided by using a set of submittal requirements, at the time of filing an application for administrative approval or Conditional Use approval, as appropriate. This plan suggests the following submittal requirements:

1. General:
 - a. Name/signatures of applicants, owners of land and/or facilities if different, and agents if any.
 - b. Written statement acknowledging and agreeing to the responsibilities under the zoning code (e.g. allowing co-location opportunities on support structures and at ground level; allowing modification/rebuilding of support structures; removal upon abandonment, etc.).
2. Siting and design:
 - a. A one-inch-equals-200 feet vicinity plan, dimensioned and identifying existing buildings, trees, and other features within 200 feet of the wireless communication facility in the City of Wichita or within 1,000 feet of the wireless communication facility in the unincorporated area of Sedgwick County.
 - b. A one-inch-equals-20 feet site plan, dimensioned.
 - c. Typical elevations of all facility elements, dimensioned.
 - d. Specification of all exterior materials and colors, with drawings, photos or samples as appropriate.
 - e. Landscape/screening plan, with all materials and sizes specified.
 - f. Appearance shown by at least two photo-simulations for proposed facilities that do not adhere to the location/design guidelines or facilities located in designated visually/environmentally sensitive locations.

3. Narrative that documents the need for the proposed facility, including in the case of new undisguised support structures, documentation such as propagation plots and/or other materials demonstrating that existing buildings and other structures cannot be reasonably utilized or modified or rebuilt to accommodate the wireless communication facility. As determined by MAPD staff, review of this documentation may be undertaken by consultants to the City or County, the cost of which should be recovered by the application fee, to further staff's understanding of the facility's locational or design (e.g., dual polarization) issues. In visually/environmentally sensitive locations the third-party analysis may also include consideration of the impacts of two or three shorter facilities in the vicinity as an alternative to the proposed facility. These visually/environmentally sensitive locations are: officially designated historic landmarks/districts; the Arkansas River Corridor; areas designated as architecturally significant by a federal, state or local entity; and other areas of civic importance. These visually/environmentally sensitive locations should be displayed on a map that is prepared and maintained by the Planning Director, approved by the Metropolitan Area Planning Commission, and made available to the public. An analysis of two or three shorter facilities should only be required if a proposed facility is in a visually/environmentally sensitive location that is designated on the map prior to the date of application.
4. Inventory of any/all wireless communication facilities already installed at the site, with names, addresses and phone numbers of the companies and contact persons.

F. Operations Standards

1. *Modification*

Wireless communication facilities are often changed or modified after construction. Wichita/Sedgwick County should require administrative review and approval for additional equipment and for the replacement or relocation of any structural support, antennas, or equipment. This review process also will aid in maintaining an accurate inventory of facilities to help in the permitting process, as well as to ensure proper taxation of these facilities.

2. *Abandonment or Discontinuation of Use*

For various reasons, all or portions of wireless communication facilities might be abandoned or no longer used. The zoning code already requires that, upon abandonment or discontinuation of use, wireless communication facilities should be physically removed. This plan also proposes that, if the use of more than 20 percent of the upper portion of a support structure is discontinued, then that portion of the structure should be removed (see item #7 on page 13).

Appendix A: Definitions

Amateur Radio. Radio equipment and associated antennas or support structures operated for the purpose of receiving or transmitting communications by a radio station as described in Section 153(g) of Title 47 of the U.S. Code and which is operated under license by the FCC.

Antenna. A whip (omni-directional antenna), panel (direction antenna), disc (parabolic antenna) or similar device used for transmission and/or reception of radio frequency signals.

Antenna Array. More than one whip, panel, disc or similar device used for the same carrier at the same frequency.

Applicant. A person or entity with an application before the City of County for a permit for a wireless communication facility.

AGL (above ground level). The actual height of the wireless communication facility from the ground to the highest part of the mount or the antenna, whichever is higher.

Broadcast Systems. Wireless communication systems that are licensed for the broadcast of AM/FM radio or television.

Camouflage. To paint or mount a wireless communication facility in a manner that requires minimal changes to the host structure and hides the facility in the context of its surroundings on the host structure.

Carrier. A company licensed by the Federal Communications Commission (FCC) that provides wireless communication. A tower builder is not a carrier.

Cellular. A personal wireless service capable of transmitting and receiving voice that operates in the 800 MHz spectrum.

Co-location. The use of a common wireless communication facility or common site by two or more carriers or by one carrier for more than one type of wireless communication technology and/or placement of two or more wireless communication facilities on adjacent properties.

Commercial Mobile Radio Services (CMRS). Per Section 704 of the Telecommunications Act of 1996, any of several wireless communication technologies using radio signals at various frequencies to send and receive voice, data and video. According to the FCC, these services are “functionally equivalent services.” Section 704 of the Telecommunications Act of 1996 prohibits unreasonable discrimination among functionally equivalent services.

Common Carrier Wireless Exchange Access Services. Services by which wireless communication is interconnected with wired communication infrastructure.

Conceal. To enclose a wireless communication facility within a natural or man-made feature resulting in the facility being either hidden from view or made part of the feature enclosing it.

Design. The appearance of wireless communication facilities as determined by selection of materials, colors, size, and shape.

Disguise. To design and construct a wireless communication facility to be an architectural feature of an existing or proposed structure in such a manner that the wireless communication facility not discernible from the remainder of the structure.

Elevation. The measurement of height above sea level. Also AMSL, or above mean sea level.

Enhanced Specialized Mobile Radio (ESMR). Private land mobile radio with telephone services.

Equipment Shelter. An enclosed structure, cabinet, shed, or box at the base of or in the general proximity of a support structure within which are housed the equipment for the wireless communication facility such as radios, batteries, and electrical equipment.

Federal Communications Commission (FCC). An independent federal agency charged with licensing and regulating wireless communication at the national level.

Functionally Equivalent Services. Cellular, PCS, Enhanced Specialized Mobile Radio, Specialized Mobile Radio and Paging. Section 704 of the Telecommunications Act of 1996 prohibits unreasonable discrimination among functionally equivalent services.

Guyed Tower. Any type of support structure that is supported in whole or in part by cables anchored to the ground or other surface.

Lattice Tower. A type of support structure that consists of an open network of braces forming a tower that is usually triangular or square in cross section.

Location. The area where a wireless communication facility is located or proposed to be located.

Modification. The changing of any portion of a wireless communication facility from its description in a previously approved permit. The FCC definitions for “modification” are different than local government rules.

Monopole. A type of support structure that consists of a vertical pole fixed into the ground and/or attached to a foundation.

PCS (Personal Communication Services). A personal wireless service capable of transmitting and receiving voice, data, text, and video messaging that operates in the 1850-1990 MHz range.

Paging. A personal wireless service that provides tone, text, and limited voice messaging that operates on several frequency ranges, usually in a limited geographic area.

Personal Wireless Services. Any personal wireless service defined in the Federal Telecommunications Act of 1996 which includes Federal Communications Commission (FCC) licensed commercial wireless telecommunications services including cellular, personal communications services (PCS), specialized mobile radio (SMR), enhanced specialized mobile radio (ESMR), paging and unlicensed wireless services, and common carrier wireless exchange access services.

Private Dispatch System. Wireless communication systems that are licensed to one user for exclusive use and not to be shared with, or leased to, other users.

Public Service and Emergency System. Wireless communication systems operated by or for a governmental agency for the delivery of emergency or other public services.

Radio Frequency (RF) Engineer. Someone with a background in electrical engineering or microwave engineering who specializes in the study of radio frequencies.

Radio Frequency Radiation (RFR). The propagation of electromagnetic waves through space.

Radio Frequency (RF) Signal. The actual beam or radio waves sent and received by a wireless communication facility. A signal is the deliberate product of a wireless communication facility. The RF emission is the byproduct.

Screening. Decorative fencing or other materials, evergreen vegetation, or landscaped earth berms constructed and maintained for the purpose of concealing a wireless communication facility from view.

Separation. The distance between one carrier's antenna array and another carrier's antenna array.

Site. That portion of a subject property where a wireless communication facility is to be placed. Any acceptable location may have several potential sites within it.

Siting. The method and form of placement of wireless communication facilities on a specific area of a subject property.

Specialized Mobile Radio (SMR). A form of dispatch or two-way communication used by companies that rent space or time from an SMR carrier. Used primarily for delivery vans, truckers or taxis within a small, definable geographic area.

Support Structure. The structure or surface upon which antennas are mounted.

- Roof-mounted. Mounted on the roof of a building.
- Side-mounted. Mounted on the side of a building.
- Ground-mounted. Mounted on the ground.
- Structure-mounted. Mounted on a structure other than a building.

Tower. Generally used to describe all wireless communication facilities or sometimes is used to refer only to those wireless communication facilities at high elevations above grade. Also used as a modifier (e.g., tower builder) or when modified (e.g., lattice tower).

Tower Builder. A company or individual that builds or manages support structures for wireless communication facilities.

Unlicensed Wireless Services. Wireless communication services operating on public domain frequencies using duly authorized devices which do not require an FCC license for their sites.

Wireless Cable System. Wireless communication services that provide point-to-multipoint communication for the provision of voice, data, text, and video that operate in the 2.1 to 2.8 GHz range.

Wireless Communication. Comprehensive term describing the wireless services covered by the location/design guidelines of the Plan. Includes the following terms as defined herein: broadcast systems, cellular, commercial mobile radio services, common carrier wireless access exchange services, enhanced specialized mobile radio, functionally equivalent services, personal communication services,

paging, personal wireless services, public service and emergency systems, specialized mobile radio, tower builder, unlicensed wireless services, and wireless cable system. Does not include amateur radio or private dispatch system.

Wireless Communication Facility. Comprehensive term describing the facilities covered by the location/design guidelines of the Plan. Includes the following terms as defined herein: antenna, antenna array, equipment shelter, guyed tower, lattice tower, location, monopole, site, support structure, and tower.

Appendix B: Wireless Communication and the Law

Planning for wireless communication is basically a relationship between the extensive (and expensive) infrastructure required and the legal mandates and constraints surrounding the deployment of that infrastructure.

A. Telecommunications Law

1. Communications Act of 1934

By 1934 it became apparent that there were many applicants for frequencies. They wanted “spectrum,” or a band of frequencies that they could use both commercially and privately. Section 332 (47 U.S.C. 332) Mobile Services states in part:

In taking actions to manage the spectrum to be made available for use by the private mobile services, the Commission shall consider consistent with this Act, whether such actions will –

- (1) promote the safety of life and property;*
- (2) improve the efficiency of spectrum use and reduce the regulatory burden upon spectrum users, based upon sound engineering principles, user operational requirements, and marketplace demands;*
- (3) encourage competition and provide services to the largest feasible number of users; or*
- (4) increase interservice sharing opportunities between private mobile services and other services.*

What the above means is that the FCC intended to allocate spectrum, and that is what the FCC has done.

2. Telecommunications Act of 1996

Section 253 of the Telecommunications Act of 1996 warns local governments that they cannot prohibit telecommunications service.

IN GENERAL. – No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.

However, Section 704 (which amends the Communications Act of 1934) of the Telecommunications Act of 1996 also preserves local zoning authority over the regulation of personal wireless services with certain restrictions, as follows:

(7) PRESERVATION OF LOCAL ZONING AUTHORITY.

(A) GENERAL AUTHORITY. Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

(B) LIMITATIONS.

(i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof-

(I) shall not unreasonably discriminate among providers of functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an

expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

(C) DEFINITIONS. For purposes of this paragraph-

(i) the term "personal wireless services" means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(ii) the term "personal wireless service facilities" means facilities for the provision of personal wireless services; and

(iii) the term "unlicensed wireless service" means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v)).

The interpretation of Section 704 has been the subject of many lawsuits in federal court.

B. Federal Communications Commission

The Federal Communications Commission (FCC) is an independent (no cabinet representative) agency of the U.S. government charged with regulating wireless communication.

The FCC is largely involved in the issuance of licenses and in rulemaking: creating administrative law for the purpose of governing, among others, wireless communication providers.

Until now, the biggest public concern of the FCC over wireless communication issues has been standards for radio frequency radiation (RFR) emissions.

C. Radio Frequency Radiation Guidelines

Section 704(a)(7)(B)(iv) of the Telecommunications Act of 1996 required the FCC to adopt regulations concerning radio frequency radiation (RFR) emissions. These regulations are embodied in the *Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation* (FCC Guidelines). The FCC requires an environmental evaluation of RFR when the FCC Guidelines are exceeded or presumed to be exceeded.

The Telecommunications Act prohibits the City and County from regulating wireless communication facilities on the basis of the environmental effects of

radio frequency emissions, so long as such facilities comply with the FCC guidelines for such emissions.

D. National Environmental Protection Act Regulations

The Federal Communications Commission (FCC) has dealt with the federal requirements of the National Environmental Policy Act (NEPA) by requiring carriers to prepare an Environmental Assessment (EA) when one or more of several potential environmental impacts are possible. The EA is filed with the FCC.

Potential environmental impacts are as follows:

- Facilities that would exceed the *Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*.
- Facilities that are to be located in an officially designated wilderness area.
- Facilities that are to be located in an officially designated wildlife preserve.
- Facilities that:
 - May affect listed threatened or endangered species or designated critical habitats.
 - Are likely to jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats, as determined by the Secretary of the Interior pursuant to the Endangered Species Act of 1973.
- Facilities that may affect districts, sites, buildings, structures or objects, significant in American history, architecture, archaeology, engineering or culture, that are listed, or are eligible for listing, in the National Register of Historic Places.
- Facilities that may affect an Indian religious site.
- Facilities to be located in a flood plain.
- Facilities whose construction will involve significant change to surface features (e.g., wetland fill, deforestation or water diversion).
- Support structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods.